

TREE POLICY GUIDELINES

To care for and maintain our trees



Contact Information

Contact Information

Landscape Architecture Division	(510) 494-4700
Street Maintenance	(510) 791-4292
Urban Forestry Division	(510) 979-5700

Table of Contents

Trees in the City of Fremont.....	1
City Trees & Private Trees.....	1
Private Tree Classifications.....	2
Tree Permits.....	3
Benefits of Trees.....	9
Benefits of Trees.....	9
Tree Preservation Ordinance.....	12
Trees & Infrastructure.....	13
Sidewalk Damage.....	13
Avoiding Utilities.....	16
Selecting a Tree.....	17
Basic Considerations.....	17
Small, Medium & Large Trees.....	19
Young, Semi-Mature & Mature Trees.....	20
Deciduous & Evergreen Trees.....	21
Evaluating Individual Specimens.....	22
Tree Establishment.....	25
Planting a Tree.....	25
Staking.....	27
Mulching.....	28
Tree Maintenance.....	30
Nutrient Deficiency & Treatment.....	30
Common Pests & Diseases.....	31
Pruning.....	33
Professional Tree Care & Preservation.....	39
What is an Arborist?.....	39
Tree Preservation.....	40
Frequently Asked Questions.....	43
Glossary.....	45
Resources.....	47

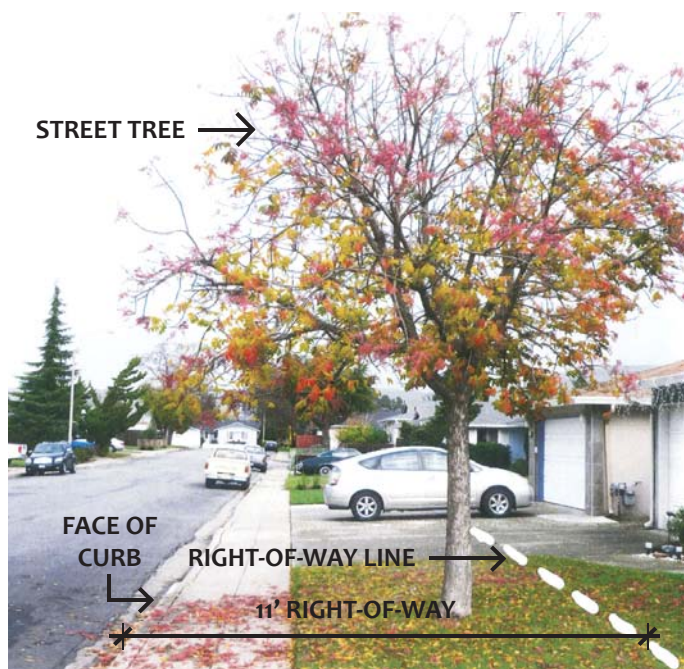
Street Trees & Private Trees

Before working on a tree, determine whether it is a street tree or a private tree. Street trees are planted in city right-of-ways throughout the city. Knowing whether a tree is a street tree or a private tree is important as the Fremont Municipal Code regulates the care of these trees differently.

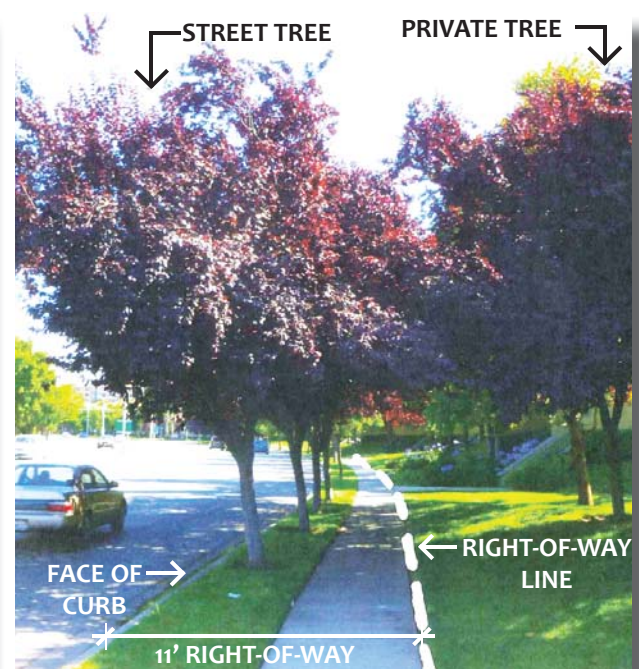
Street Tree: A tree whose trunk is within the city right-of-way area starting from the face of curb and extending 11' into a property. In many older neighborhoods the right-of-way area extends only 10' in from the face of curb.

Private Tree: A tree whose trunk is completely outside of the city right of way area

Street Tree or Private Tree?



Monolithic Sidewalk - Sidewalk attached to curb



Detached Sidewalk - Sidewalk and curb are separated

Private Tree Classifications

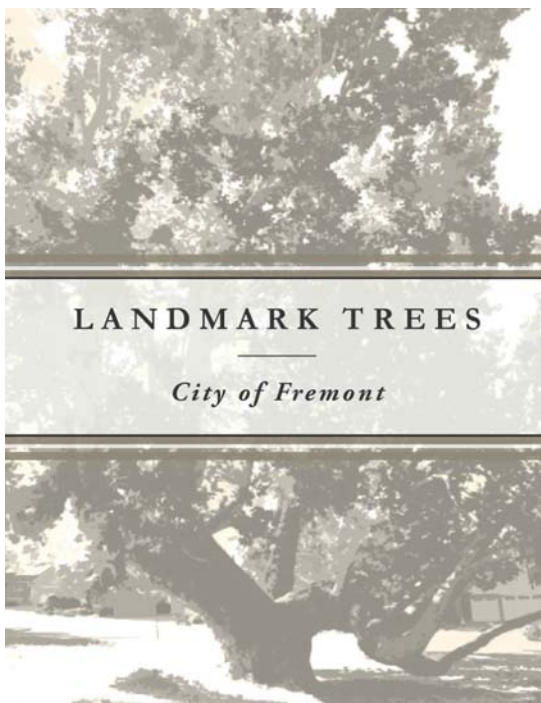
Protected, Exempt & Landmark Trees

Private trees in Fremont receive different protections from abuse, damage and removal based on what their classification is. All of Fremont's trees are classified as either Protected, Exempt or Landmark Trees

Protected Trees: All street trees and most mature private trees that receive special protection in the Fremont Municipal Code. Any work on these trees requires a permit.

Exempt Trees: There are some privately owned trees that do not receive special protection in the Fremont Municipal Code. No permit is required to perform work on these trees.

Landmark Trees: Trees designated by City Council to have cultural, historic or social value to Fremont that receive protection beyond that of other Protected Trees. The Landmark Trees list is found at www.fremont.gov/landmarktrees. Removal of these trees requires City Council approval. Landmark trees can occur as Private Trees, Street Trees, in parks or anywhere in the city.



The Landmark Trees Publication is available online at www.fremont.gov/landmarktrees



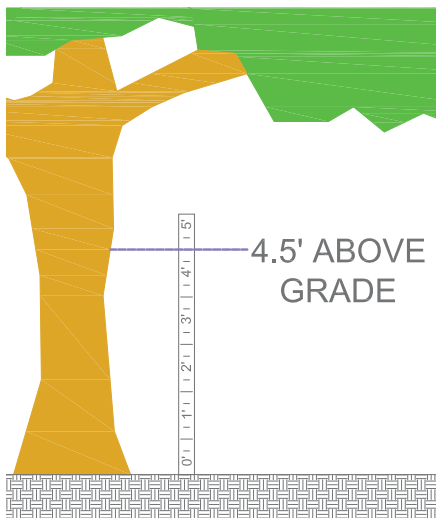
This Landmark Deodar Cedar on Mission Boulevard was planted in the 1930s

Do I Have a Private Protected Tree?

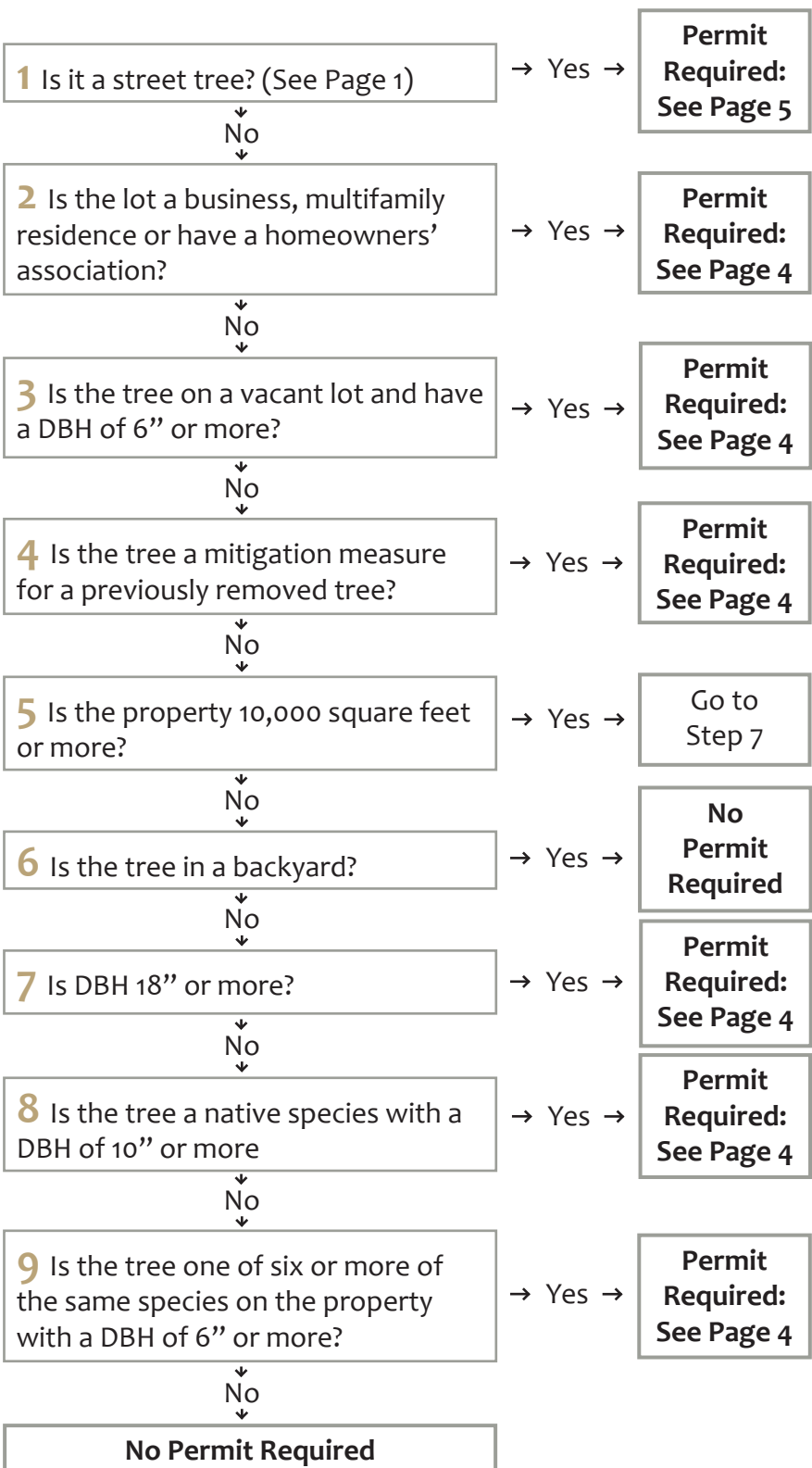
Is a Tree Removal Permit Required?

If a tree is a protected tree a permit is required to remove it. Use the chart to determine if a tree is protected:

DBH or Diameter at Breast Height is the measurement of a tree trunk's diameter at four and a half feet above grade

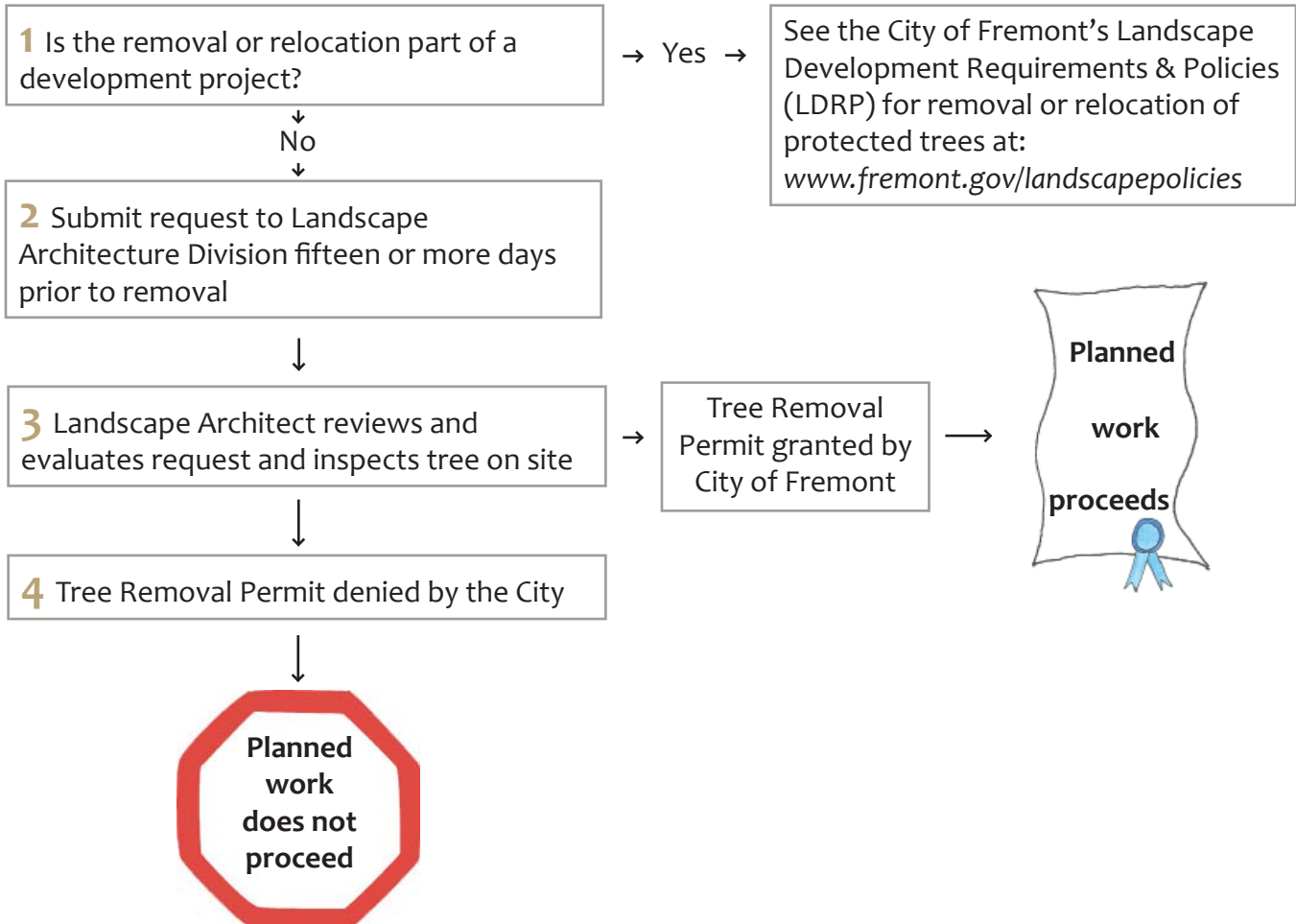


Measuring Square Feet: To find a property's square footage, use the maps made by Fremont's GIS team at www.fremont.gov/GIS



Removing a Private Protected Tree

The Permit Process



If a permit is granted, mitigation is required:

Removal: Each tree must be replaced with

- 15 Gallon tree for single family residences
- 24" Box tree on all other properties

Relocation: Permit has conditions ensuring health of tree

Optional Appeal Process

- Appeal application submitted to city clerk within 10 days of permit denial
- Notice of Appeal Hearing mailed to applicant at least 10 days in advance
- Appeal Hearing before Fremont City Council
- City Council denies or grants appeal

Removing a Street Tree

The Permit Process



Removing a street tree requires a contractor to obtain a permit from the Landscape Architecture Division

1 Resident submits request to Fremont's Urban Forestry Division (510) 979-5700 and describes reason for request



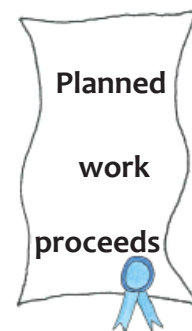
2 Urban Forester reviews request, inspects tree and leaves a letter to the resident informing them of the visit and if their request is approved



3 If request is approved, resident selects a contractor from the city's Approved Tree Contractors List at www.fremont.gov to perform maintenance

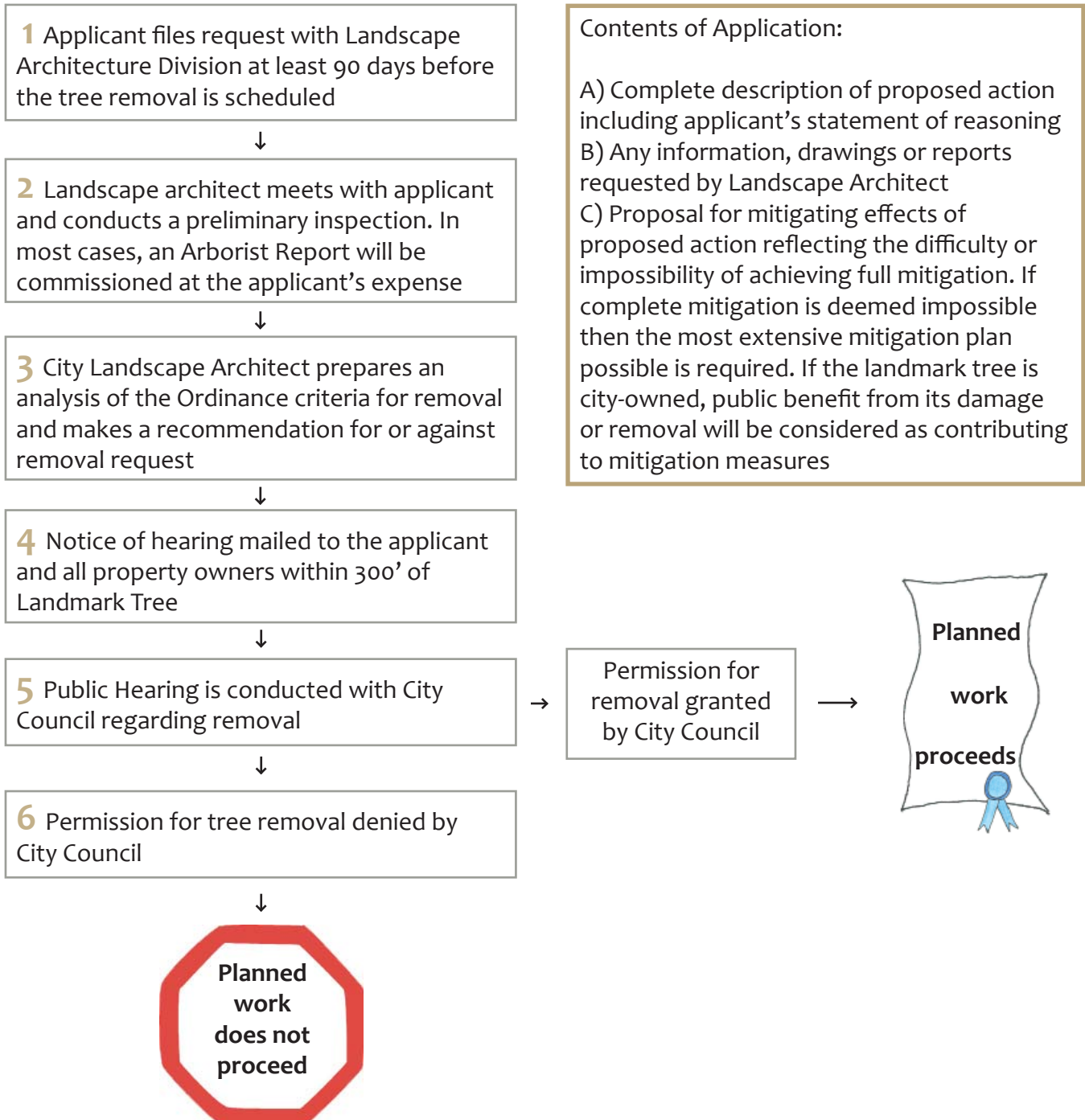


4 Contractor obtains removal permit from Landscape Architecture Division



Removing a Landmark Tree

Obtaining Permission



Maintenance of Street Trees

Obtaining a Pruning Permit

Maintenance of street trees is the responsibility of the adjacent property owner (FMC 6-2201). To ensure quality care for street trees, Fremont requires permits for any work performed on a street tree other than pruning limbs under 2" in diameter. When a street tree needs pruning, obtain a permit by calling in a work order to the City's Urban Forestry Division before starting work.

All work on street trees must be performed by an approved contractor with the following qualifications:

- Insured
- Bonded
- State of California C-27 Contractor's License
- City of Fremont Business License
- ISA Certified Arborist on staff



These trees are located in the city right-of-way and would require a permit from the Urban Forestry Division to prune or the Landscape Architecture Division to remove

1 Resident submits maintenance request to Fremont's Urban Forestry Division (510) 979-5700 and describes reason for request



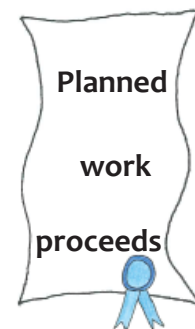
2 Urban Forester reviews request, inspects tree and leaves a letter to the resident informing them of the visit and if their request is approved



3 If request is approved, resident selects a contractor from the city's Approved Tree Contractors List at www.fremont.gov to perform maintenance



4 Contractor obtains maintenance permit from Urban Forester



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Benefits of Trees

Environmental

The Tree Preservation Ordinance benefits the city of Fremont by protecting its trees. In 1996, Fremont joined the Tree City USA Program which helps cities protect their urban forests and educate the public about the benefits of trees. The city also has a Landmark Tree Program that specifies trees that are of great historical or social value to the city's residents. Landmark Trees receive special protection beyond that of other city trees. The Tree Preservation Ordinance improves the city through many environmental, financial, psychological and visual benefits.



Environmental Benefits of Trees

Climate Control: Trees reduce the Heat Island Effect commonly found in urban areas by reducing the amount of paved surfaces directly exposed to sunlight. By providing shade, paved surfaces absorb less solar radiation and temperatures are not artificially raised.



When trees are planted directly adjacent to a building the amount of energy and money needed to heat and cool the building is greatly reduced

Improve Air Quality: Trees improve air quality in urban areas by reducing energy use and removing existing pollutants such as carbon monoxide, nitrous oxides, sulfur dioxide and ozone from the air.¹ Trees planted next to buildings greatly reduce a building's energy use from heating and cooling, thus reducing local power plant emissions.² This is significant as 40% of greenhouse gas emissions in the United States come from heating and cooling buildings.³

Trees also absorb particulate pollution, generally between 1.3 – 3.9 lbs. per acre of tree covered landscapes in urban areas daily.¹ Pollution remediation is particularly significant when trees have large, rough textured or pubescence-covered leaves.⁴

¹ Nowak, David J. Air Pollution Removal by Chicago's Urban Forest. Publication. Chicago: USDA Forest Service, 1994. Print

² Heisler, Gordon M. 1986. Effects of individual trees on the solar radiation climate of small buildings. Urban Ecology. 9: 337-359.

³ United Nations Environment Programme. Buildings and Climate Change. Publication. Paris, France: UNEP DTIE, 2009. Print

⁴ Wu and Davidson, "Acidic Precipitation- Sources, Deposition, and Canopy Interactions," Water, Air and Soil Pollution (1990)

Benefits of Trees

Financial

Supply Oxygen: Trees provide a valuable source of oxygen for humans and other animals in urban and rural areas. According to the City of Vancouver's Urban Forestry Program, it takes only two trees to produce an adult human's annual oxygen supply.

Improve Water Quality: Trees improve water quality as they intercept, store and clean water through phytoremediation. Trees lower water treatment costs by absorbing pollution found in runoff and reducing the overall volume of runoff requiring treatment. The City of Seattle estimates that trees save the city \$1.3 million dollars in storm water treatment annually.

Minimize Erosion: Trees minimize erosion as their roots help hold sloped terrain in place.



Trees are used to mitigate air pollution along a freeway

Financial Benefits of Trees

Increased Property Values: Trees usually increase property values between 5 – 30% depending on the views offered in the area and the size of the trees.¹ The City of Modesto estimates \$4.9 million in benefits provided to the city annually from its urban forest. As the city spends \$2.6 million to maintain its urban forest each year, the financial benefits far exceed the costs associated with the city's trees. It is believed on average cities receive \$1.89 in benefits for every dollar spent maintaining their urban forest.²



Every \$1 spent by cities on trees



will generate \$1.89 in benefits!

¹ Payne, B.R. and S. Strom. 1975. The contribution of trees to the appraised value of unimproved residential land. *Valuation*, 22(2):36-45.

² McPherson et al., "Benefit-Cost Analysis of Modesto's Urban Forest," *Journal of Arboriculture* 25, no. 5 (September 1999)

Benefits of Trees

Psychological & Visual

Psychological Benefits of Trees

Reduced Stress: Access to trees is a proven stress reducer. This is seen through increased job satisfaction and productivity among workers who have views of trees at their jobs. Hospital patients in a room with a view of trees have also been documented to recover 8.5% faster than other patients.¹

Reduced Crime: Trees reduce urban crime by improving the quality of life for city residents and reducing psychological stressors leading to crime. Public housing projects in Chicago whose residents had views of trees reported 50% less domestic violence than housing projects whose tenants could not view trees.²



Areas with trees provide a psychologically calming environment that reduces crime, health problems and anxiety²

Visual Benefits of Trees

Color: Trees can add color to a built area where it may be lacking. This improves user satisfaction of the space and can increase its overall use

Mass: Trees can screen an area without the use of psychologically stressful walls or fences. In this way trees provide privacy while allowing a space to retain its beauty



Scale: Trees provide physical scale as an individual uses a space. In urban areas trees are often used to visually balance nearby structures that dwarf a landscape

¹ Ulrich, "Human Responses to Vegetation and Landscapes," Landscape and Urban Planning, 1986, 29-44.
² Lovelady, "Handsome Factories Yield Unexpected Joys," Wall Street Journal, December 1, 1965.

Tree Preservation Ordinance

Overview

The Tree Preservation Ordinance (FMC 4-5100) is a cohesive piece of citywide legislation that covers the following categories of information as it relates to city policy:

- Benefits of Fremont's Urban Forest
- Common Arboreal Definitions
- Allowable Causes for Tree Removal
- Application Process for Tree Removal & Relocation
- Standards of Mitigation for Tree Removal
- Standards for Cash Payments in Lieu of Mitigation
- Procedure for Evaluation of Tree Removal & Relocation
- Procedure for Designation of Landmark Trees
- Protection & Removal of Landmark Trees
- Removal of Landmark Trees within Planned Development
- Unlawful Removal of Protected Trees & Penalties



Sidewalk Damage

Preventing & Repairing Damage

California Street and Highway Code 5610 states property owners are responsible for the maintenance of the sidewalks adjacent to their property.¹

Preventing Sidewalk Damage

Preventing sidewalk damage caused by trees is much easier than waiting until damage has occurred to mitigate the situation. Preventing damage is best done in the following ways:



Creating large planting wells for trees is an easy way to prevent sidewalk damage and help protect the root systems of trees

Proper Planting Space: Tree roots extend well beyond the dripline up to two to three times the diameter of the tree canopy. As this is the case, trees should not be planted directly against any pavement. Although it may not be feasible to plant a tree far enough away from the sidewalk that the dripline will not extend over pavement, a proper setback is imperative to quality tree health and preventing damage to paved infrastructure.

Dripline: The width of the leaf crown, as measured by the outward extent of the foliage



Proper Tree Selection: Choose tree species that are typically successful in Fremont. When planting near pavement, look for species with roots that penetrate deep into the soil rather than expand out on the soil surface. Also look for trees with smaller overall root systems or root systems which grow at a slow to moderate rate. Although all trees are beneficial in the right context, not every tree is appropriate for every space due to different spatial, soil and water needs.

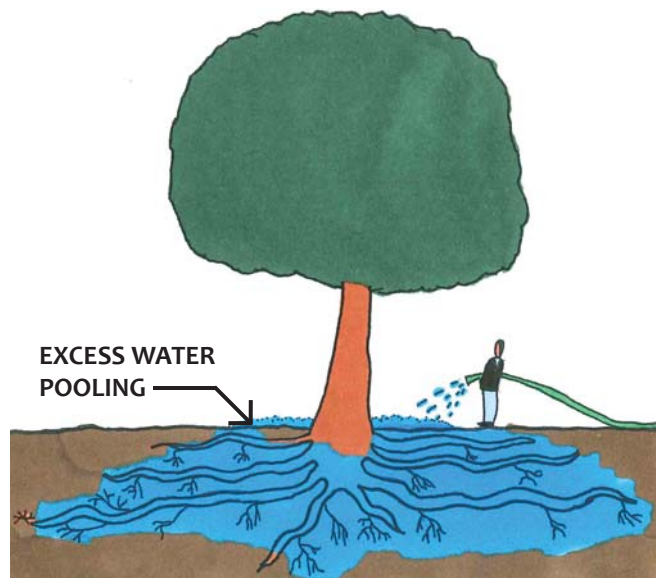
¹ Tree Guidelines, Public Law 4-5100. (March 10, 2011)

Practice Deep Root Watering: Deep root watering is saturating an area with water until the soil cannot accept any more. This point is reached when excess water begins to pool. By saturating the soil, water is absorbed deeper into the soil, encouraging tree roots to delve farther into the ground to collect the water. This prevents the growth of excess surface roots so that sidewalk damage is less likely. The deeper roots also help the tree sustain itself during drought. Although this practice will help encourage root systems to grow farther into the ground, it must be carefully managed. Deep Root Watering should only be used on healthy trees that were not recently transplanted or subjected to other significant sources of stress.

Deep root watering should only take place in the morning during the tree's active growing season. Trees should never be left in damp soils overnight when pathogens and diseases are likely to establish. The proper frequency for deep root watering varies depending on the tree's species, soil and expected annual rainfall.

Repairing Damage

Repairing Sidewalk Damage: While property owners must maintain adjacent sidewalks within the city right-of-way, a request for assistance may be made if the sidewalk presents a potential hazard. This request is made to the Public Works Department at www.fremont.gov ("Report a Concern" Link) or by phone at (510) 979 – 5700. Making a request does not guarantee that a work crew will be sent to the site. Requests for repair are handled based on resource availability, urgency and order received.



When water pools on the soil surface and is not accepted within 30 to 60 seconds discontinue applying water



This poorly designed curb has been replaced many times

Repairing Tree Damage

Root Pruning

Repairing Tree Damage: Property owners may hire a Certified Arborist to inspect a tree at their own expense and decide if root pruning is needed. The owner is ultimately responsible for ordering any work performed on a tree believed to have caused sidewalk damage. If any pruning or removal of the tree is desired, the property owner must obtain the proper permit from the City of Fremont before any work takes place.

What is Root Pruning?

Root pruning is a practice in which roots growing in an undesired direction (ie. towards sidewalks, building foundations, etc.) are pruned to discourage future growth.¹ Although future growth will be impeded, it is a risky procedure that should only happen if all other options have been exhausted. Pruning root systems compromises the structural integrity of trees and leaves them open to infection. If root pruning, keep the soil within the dripline well drained for the following few growing seasons to minimize the risk of pathogen infection. Currently, the best practices in arboreal medicine are still preventative. As this is the case, proper planning, planting, and maintenance of trees are the best ways to fight sidewalk damage and disease in trees.

¹ Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), 337-338



Photos from a root pruning project along Fremont's Blacow Road in 2011

Repairing Tree Damage

Avoiding Utilities

Trees can pose a hazard to utilities. Even when digging to plant trees, proper planning is needed to prevent a deadly gas leak or a disruption in water service. Keep in mind that tree roots can detect water in buried pipes and will break water lines to reach moisture. Thus, avoid planting a tree where its dripline will eventually be on top of piping or other utilities.

The best protection against disrupting utilities is to use the 811 Call Before You Dig Program. Any Contractor performing work that could disrupt underground utilities must use this service. Even with the use of this program however, all residents must obtain proper city permits before digging occurs. When utilized, 811 Call Before You Dig will send a worker to a site where digging is planned. The worker will mark all underground utilities found on the site with spray paint so that their location is known prior to digging. Utilities can be located through this program whether they are on public or private land. In Northern California the most direct way to contact the 8-1-1 Program is to call 1-800-227-2600 or visit www.usanorth.org at least two business days before digging is planned to occur.¹

Avoiding overhead utilities is a matter of planning. Plant only small trees under power lines and avoid planting in areas where the canopy is likely to expand within close range of electrical wires. Pacific Gas & Electric Company recommends leaving a 10' buffer between the edge of expected growth and overhead power lines. If a tree is already encroaching on an overhead power line, contact PG&E at 1-800-743-5000 or any utility arborist with Line Clearance Certification.



A safe buffer of more than 10' between power line and tree is seen in Rix Park



**Know what's below.
Call before you dig.**

¹ "811," USA North, www.usanorth.org.

Selecting a Tree

Basic Considerations

Selecting the right tree is important to the viability of a tree in a space and lays the foundation for years of social and economic benefits. Thus selection is an important process with many guidelines to consider at each step.

Determining the Planting Space

What size tree is appropriate?

Look at the ground plane to determine how far out surface roots can run unobstructed. Look above for building edges and overhead power lines.

What type of soil drainage is on site?

Clay-based soils, such as those found in most of Fremont, retain moisture for longer. While this is desirable for some trees, it can kill others. Sandy soils drain quickly while silty soils fall between these extremes.

What is the sun/ shade pattern?

Different trees have different sun/ shade requirements. Afternoon sunlight is more intense than morning light, thus it is important to know how much sun and shade and area will receive throughout the day as well as at various points of the year.



Trees are given different planting spaces depending on the expected spread of their structures and root systems





Many property owners enjoy the flowers and fruit produced by trees while others view them as a nuisance because of the extra maintenance



Desired Level of Maintenance

Will the tree receive regular attention?

Some tree species require regular care whereas others live off of the resources naturally provided and are very self-reliant. The best choice depends on how much time the owner wants to invest in a tree.

Is seasonal leaf litter or dropped fruit acceptable?

If cleaning leaf litter is an issue, consider planting an evergreen tree that will drop fewer leaves throughout the year rather than a deciduous tree which drops its entire canopy on an annual basis. If fruit droppings are a problem, many species of trees have male and female varieties in which the males will not produce fruit. For example, many people enjoy olive trees but worry about the fruit staining nearby pavement. Planting a male tree or fruitless variety will eliminate this problem completely.

Selecting an Area Appropriate Species

Is the species native to this area?

Although Fremont's plant community benefits from both native and imported species, native plants are always the most ecologically responsible choice.

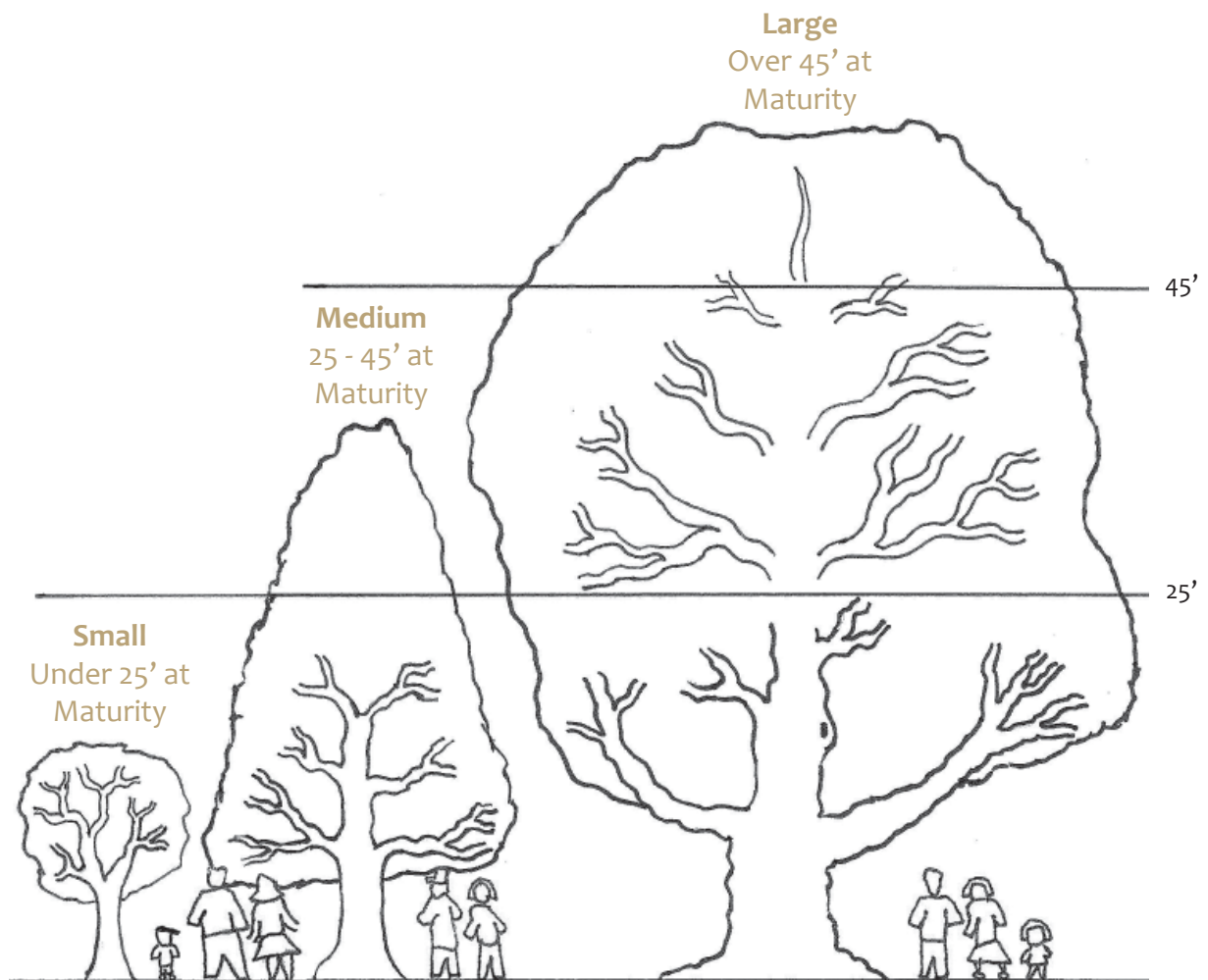
Is this tree species invasive to the area?

Invasive species are typically imported plants that outcompete native plants for resources and can spread uncontrollably. Invasive plants cause many ecological problems that threaten the very survival of precious endemic plant species. Invasive species should never be planted for any reason.

Selecting a Tree

Small, Medium & Large Trees

Trees, depending on the species, may grow to anywhere from six feet to several hundred feet tall with similar canopy spreads. Knowing what constitutes a small, medium or large tree and what is appropriate in a given location is important. Environmentally, large trees offer more as they produce more oxygen, sequester more carbon and particulate matter and offer more climate mitigation. All properly planted and maintained trees however, are environmentally and socially beneficial. Overall, it is best to plant the largest tree that can healthily grow in a space.¹



¹ Greenprint Tree Guide: For the Greater Sacramento Area (Sacramento: Sacramento Tree Foundation, 2009), 3.

Selecting a Tree

Young, Semi-Mature & Mature Trees

Young, semi-mature and mature are the key stages in the life cycle of a tree. Installing a tree at a certain stage of its life may be optimal depending upon the goals of the tree planting. The benefits and challenges associated with each life cycle stage are described below:

Young		Semi-Mature		Mature	
Benefits	Challenges	Benefits	Challenges	Benefits	Challenges
<ul style="list-style-type: none"> • Most affordable • Highest establishment success rates • Easy and affordable transportation • Requires little to no protective pruning before transportation 	<ul style="list-style-type: none"> • Often lacks the scale and drama desired by site user. Achieving this effect may take a few growing seasons • A landscape composed of young trees will appear less sophisticated and established 	<ul style="list-style-type: none"> • Provides some scale and drama immediately after planting while building anticipation for more as it grows into maturity • More affordable than large, fully mature trees 	<ul style="list-style-type: none"> • More difficult to transport than smaller trees • May require moderate protective pruning before transportation to site • More expensive than young trees 	<ul style="list-style-type: none"> • Provides scale and drama as soon as it is planted • Provides the illusion of a mature and established landscape 	<ul style="list-style-type: none"> • Takes longer to recover from transplanting • Lower establishment success rates • May require protective pruning prior to transplant • Expensive to transport if a truck or crane is needed



Young *Magnolia x soulangeana*



Semi-Mature *Jacaranda mimosifolia*



Mature *Magnolia grandiflora*

Selecting a Tree

Deciduous & Evergreen Trees

Deciduous and evergreen trees offer different sets of benefits and challenges to a property owner. A property owner may decide that it is more lucrative to plant one instead of the other or a mix of both depending on the arboreal benefits most needed in a space.

Evergreen

Benefits

- Provides a consistent source of shade throughout the year
- Provides more insulation and reduces energy use if planted near a structure
- More effective at mitigating air pollution as contaminants are held in foliage longer

Challenges

- May require more water in times of moderate drought depending on the species

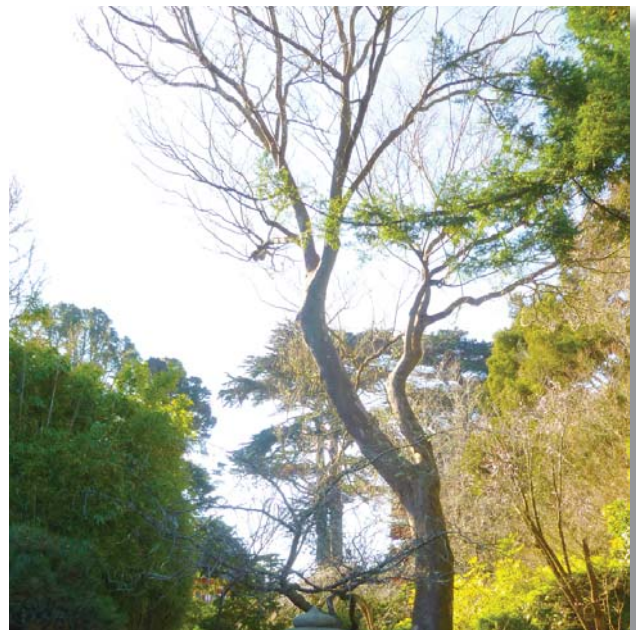
Deciduous

Benefits

- Provides visual drama and seasonal change
- Sometimes easier to cure infections when the tree defoliates
- Transplanting during dormancy is easier
- Allows for light in Winter darkness

Challenges

- Requires more seasonal and annual maintenance



Selecting a Tree

Evaluating Individual Specimens

Evaluating a tree prior to purchasing is important to healthy establishment. Individual specimens should be evaluated on a number of criteria.

Curled, discolored or dead leaves may be symptoms of nutrient deficiencies. Do not buy a tree that has leaves in this condition.



Included bark denotes weak spots in a tree. This branch may fail in the near future as there is a large amount of included bark running down from the crotch.



The tree above has good form as the branches grow up and out from the trunk

Crown: Is the shape typical for that species?

A misshapen crown denotes improper pruning and poor overall structure. If the shape of the crown is noticeably abnormal avoid the tree.

Leaves: Are the leaves proportional to the size of the tree? Are they wilted, dry, curled, abnormally large or dead? Are there nutrient deficiencies such as yellowing?

Undersized leaves are usually a sign of nutrient deficiency or a root issue that makes it difficult for the plant to uptake nutrients. Leaves that are wilted, curled, dead or appear nutrient deficient are not optimal. Although these problems can often be corrected in an established tree, a new tree will experience increased levels of stress during planting and its chances of failing are increased if it is already suffering from other ailments.

Branches: Are any branches broken or dead? Do any cross in front of another or exhibit included bark at crotch angles? Is there even distribution of branches throughout the tree?

Branches that cross or exhibit included bark at the crotch angles demonstrate poor structure and are problems that require maintenance in the future. Branches that are broken or dead are a sign of poor care. Overall, look for evenly distributed branches with generous crotch angles that do not cross or have included bark. This indicates good structure that gives the tree a healthy foundation from which to grow.

Evaluating Individual Specimen

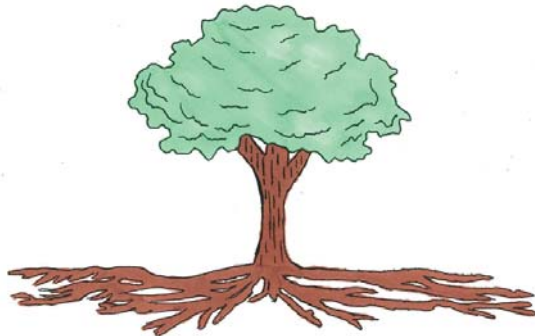


The tree at left lacks a central leader due to poor management. The trees at right however, have clear central leaders directing growth



The tree at left illustrates good caliper as the trunk is large at the base and decreases in size as it moves up the trunk. The tree at right has poor caliper with little variation in the trunk's diameter

This diagram illustrates a tree with healthy roots that expand down and out from the base of the trunk.



This drawing shows a tree with girdling roots that has poor structural stability.



Trunk: Is there a single central leader in the tree directing growth? Does the tree trunk exhibit proper caliper (thicker at the base while gradually thinning towards the top)?

A strong central leader is the best sign that a tree will develop to withstand wind, soil compaction and other obstacles. Proper caliper indicates that the base of a tree will support canopy growth in the face of wind or other movement the tree will face. Poor caliper often denotes that a tree was staked in a nursery for too long and will not do well in the landscape.

Roots: Are roots well distributed around the trunk? Are the roots wrapping around each other or growing back towards the root ball?

Roots growing out and evenly on all sides of the tree denote good root health. This tree will obtain essential nutrients and be equipped with a solid base for healthy canopy and trunk development. Roots that are wrapped or growing back towards the root ball denote a plant that has been placed in a container that was too small. Trees demonstrating these characteristics will fail from lack of nutrients, as the roots have not expanded out, or will fall over due to poor structure.

Diseases & Water Stress: Does the tree have borer holes from insects or any abnormal color or marks? Is there any fungus or mildew present? Does the tree exhibit any signs of nutrient deficiencies? Are there signs of water stress such as reduced growth or cracked bark?

Insect borer holes, abnormal color or the presence of fungus or mildew indicate that a tree is already ill and will likely fail to recover. There is no cure for most arboreal diseases, only treatments that minimize the impact of these illnesses. A tree that is already water stressed can sometimes be salvaged, but if it is being purchased and transplanted the chances of a recovery are minimal. If a tree is already under stress before being transplanted, the stress from the move will likely kill the tree.



Borer holes are caused by small insects and are harmful to the tree's health. Rarely do trees with borers recover.



It is always important to inspect plant material for diseases and nutrient deficiencies prior to purchasing



Planting a Tree

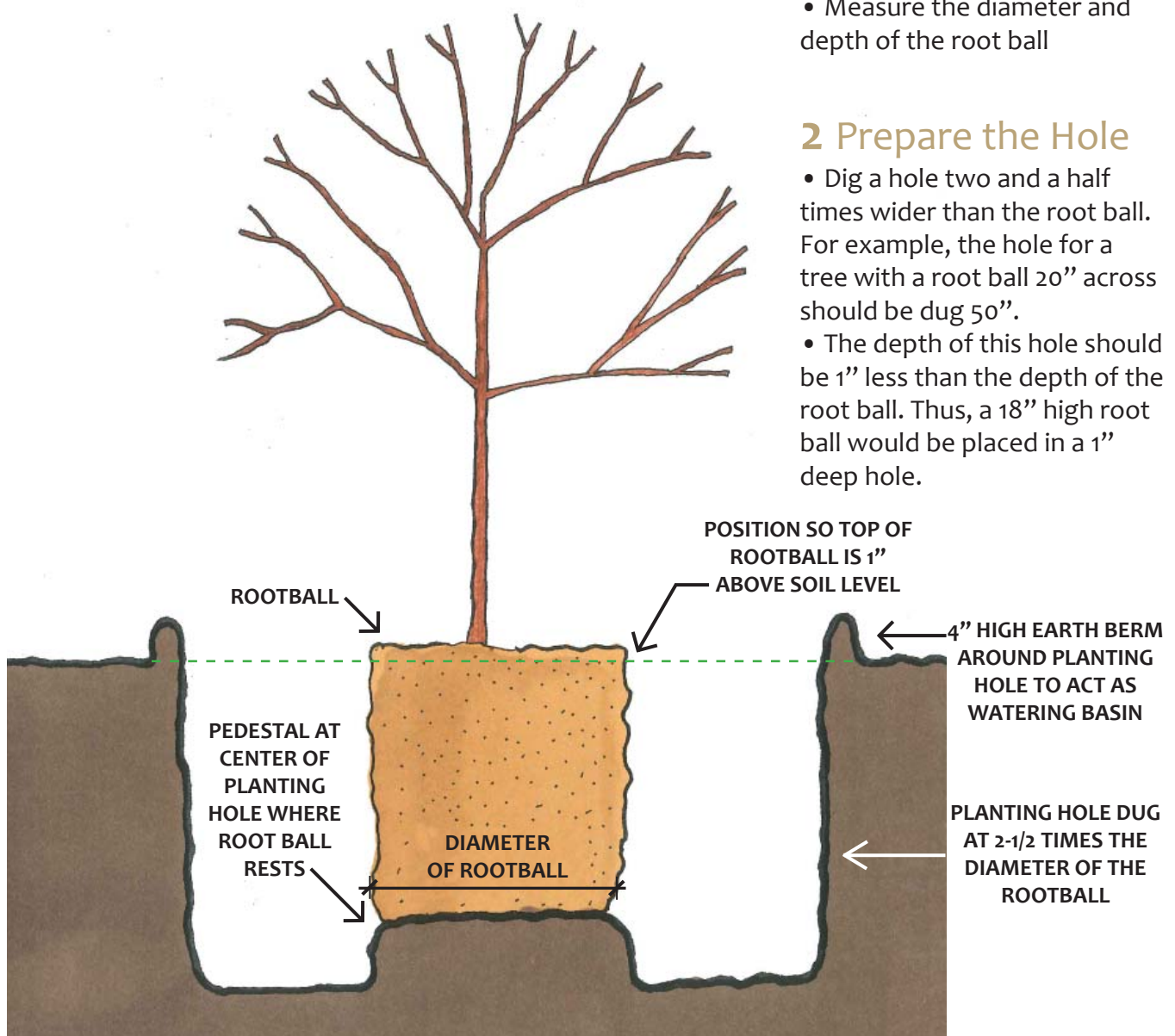
5 Step Tree Planting

1 Measure Root Ball

- The root ball contains the root system's core. It starts at the root collar and extends to the bottom of the root system.
- Measure the diameter and depth of the root ball

2 Prepare the Hole

- Dig a hole two and a half times wider than the root ball. For example, the hole for a tree with a root ball 20" across should be dug 50".
- The depth of this hole should be 1" less than the depth of the root ball. Thus, a 18" high root ball would be placed in a 1" deep hole.



3 Place the Tree

- Spread out the roots so that they are radiating out from the rootball and not circling or girdling each other.
- Gently lower the tree into the hole until the rootball comes to rest at the bottom.
- Support the rootball as it is lowered to prevent damage.

4 Backfill

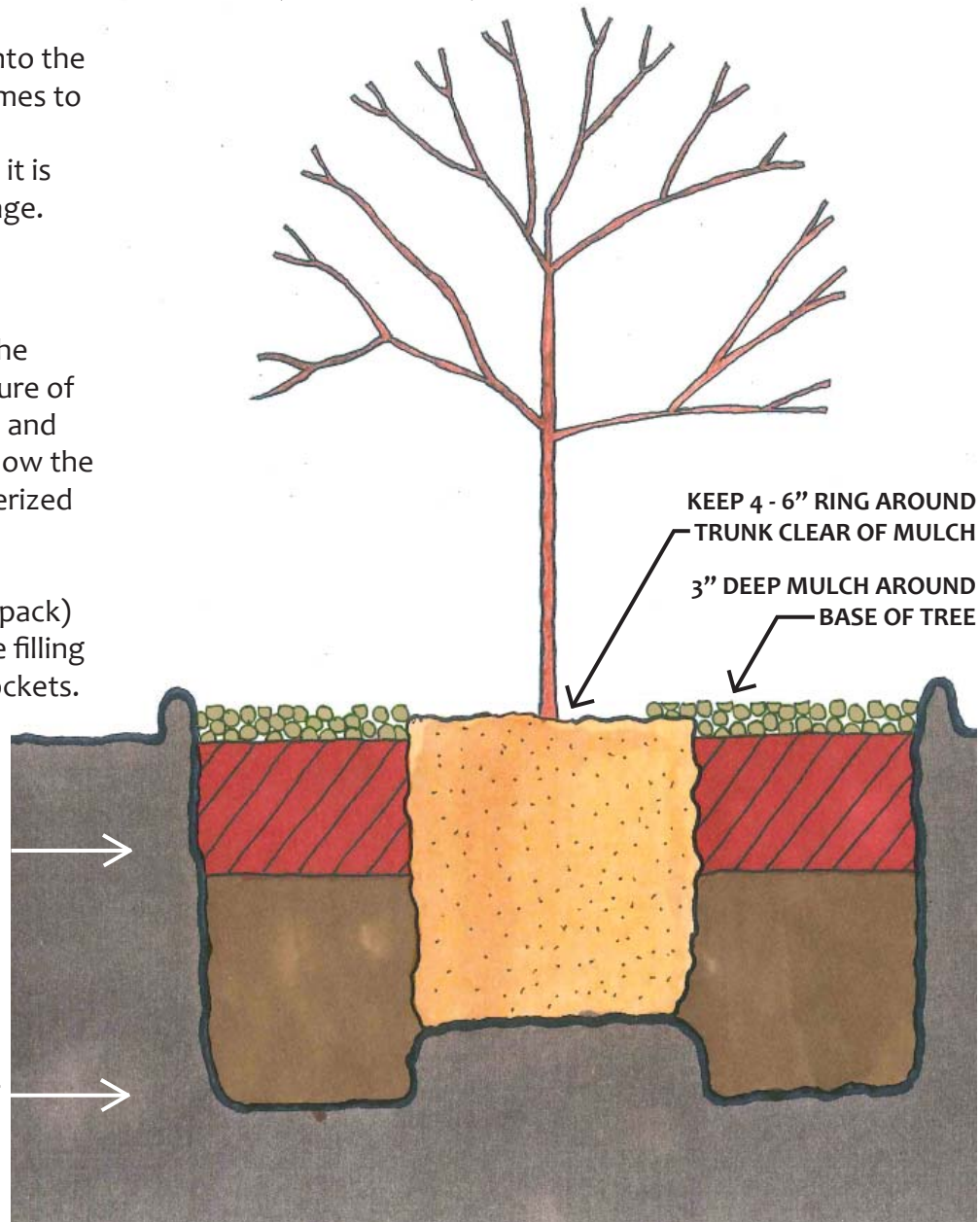
- Backfill the top 12" of the planting hole with a mixture of 70% pulverized native soil and 30% organic compost. Below the top 12" backfill with pulverized native soil from the site.
- Compact the soil (bootpack) from bottom to top while filling the hole to remove air pockets.

BACKFILL MIX FOR TOP 12":
70% PULVERIZED NATIVE SOIL
30% COMPOST

BACKFILL WITH NATIVE SOIL
BELOW THE TOP 12"

5 Water Thoroughly

- Water the soil around the tree until it can no longer accept water (soil saturation).



Staking

4 Steps of Staking



Nurseries often put stakes against tree trunks. In the long run this practice damages the tree and prevents it from establishing caliper



Properly Staking: The stakes are 18" from the base of the trunk and the ties connecting the trunk to the stake are rubber so damage will not occur

Although staking trees is common, it should only happen if necessary. The best practices for staking are described below:

1 Remove the Nursery Stake

The nursery stake is the vertical post tied directly to the tree's trunk or central leader before being sold. These stakes serve no functional purpose. They are tied directly to the trunk and damage the fragile tissue of young trees.

2 Decide Whether to Stake

A tree should be staked if it cannot hold itself upright without support. The central leader does not need to be perpendicular to the ground, but it should not bend down towards the ground. Providing the opportunity for some trunk movement allows for proper caliper development.

3 Placing the Stakes

Stakes should be placed 18" from the base of the trunk on either side parallel to one another. The stakes should be placed perpendicular to the dominate wind current in the area. For example, if wind moves through the area in a north to south direction, stakes should be placed on the east and west sides of the tree so that it receives maximum wind exposure and start to adapt.

4 Tie Tree to Stakes

Stakes should be tied loosely allowing for maximum safe trunk movement. When a young tree moves in the wind, it develops caliper and good structure. The material used to tie the tree and the stake should not damage the bark of the tree. Rubber strips or rubber encoded wire are usually the safest materials to use for adhering a stake to a young tree.

Mulching

General Benefits & Types

Mulch: A material spread on the soil to conserve moisture and deter weed growth while protecting the soil and tree roots from soil crusting and freezing

Mulch enhances the physical and economic productivity of urban trees if placed correctly. If used incorrectly, mulching can cause plant disease or death. The primary benefits of mulching are as following¹:

Climate Control: Mulch keeps tree roots cooler in the summer and warmer in the winter by providing insulation. It protects roots from burning or freezing.

Conservation of Moisture: Mulch allows the soil around the root system to retain moisture longer by reducing evaporation, thus minimizing the amount of water needed to sustain a tree.

Decreased Compaction: Mulch creates a barrier between roots and sources of soil compaction such as people, animals or machinery. As this is minimized, the soil's aeration is improved which leads to a better exchange of oxygen, nutrients and moisture.

Erosion Prevention: Mulch reduces the volume and velocity of storm water runoff passing through a site. This happens by increasing soil percolation which is beneficial in Fremont where much of the land has clay soil and cannot readily accept large volumes of water.

Reduced Weed Growth: Reduced weed growth saves the labor cost associated with removing them. More importantly however, it reduces the amount of pesticides used on the site to control unwanted growth. This protects local water tables as well as San Francisco Bay where most of Fremont's runoff eventually ends up.

Common Mulches



Wood Chips



Bark Chips



Shredded Bark



Pine Needles



Recycled Paper



Crushed Rock



Polyethylene



Woven Polypropylene

¹ Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), 137-178

Mulching

Selecting & Applying Mulch

Selecting a Mulch

There are many mulches available, the most common being wood chips, bark chips, shredded bark, pine needles, recycled paper, crushed rock, polyethylene and woven polypropylene.

Wood chips, bark chips, shredded bark and pine needles are organic mulches whereas recycled paper, crushed rock, polyethylene and woven polypropylene are industrially processed. Organic mulches are preferred since they add nutrients and enhance soil structure as they break down. Wood and bark chips are the most common mulches and provide nearly all of the benefits associated with mulch. Pine-based mulch is best used where a lower pH level in the soil is desired. Crushed rock cannot retain moisture or stimulate activity from microorganisms. In Fremont, where much of the soil is clay-based and has a slower infiltration rate, this choice is not optimal. Recycled paper offers most of the benefits of wood and bark chips, but can introduce aluminum to the soil leading to toxic conditions for plants and animals.¹ Polyethylene and woven polypropylene are

usually used for erosion and weed control but offer few other benefits.

Once a mulch is picked, inspect it before buying to make sure there are no foreign objects. Also check for any mildew or other fungus. If there are any foreign objects do not purchase it.

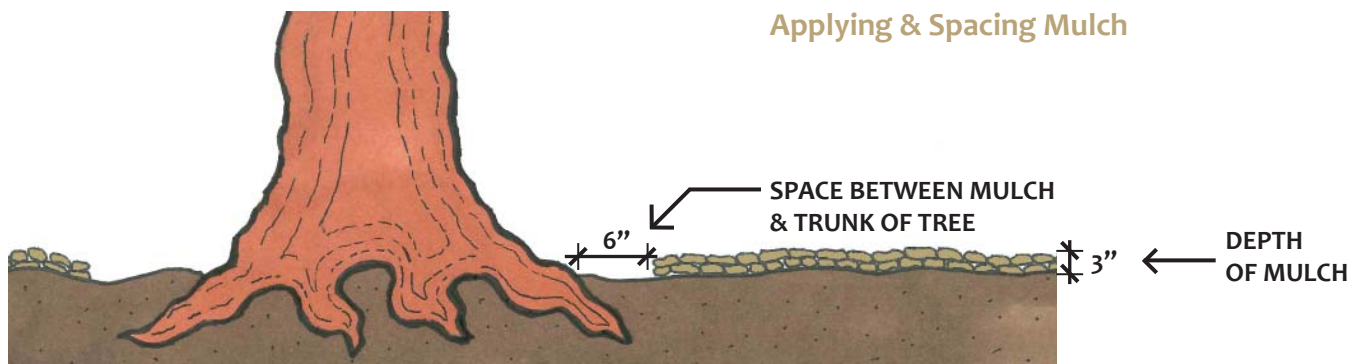
Applying Mulch

Spread the mulch evenly throughout the planting well to a 3" depth.²

After spreading, pull back any mulch that is on the base of the trunk. There should be a 4 - 6" ring around the tree trunk that remains without mulch. If this ring is not created, the tree will be more susceptible to damage by rodents or infection by a pathogen.

¹ Teresa Mossor-Pietraszewska, "Effect of Aluminum On Plant Growth and Metabolism," *Acta Biochimica Polonica* 48, no. 3 (Fall 2001): 673-86.







² Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), 137-178



Tree Maintenance

Nutrient Deficiency & Treatment

Fertilizing benefits a tree when a crucial nutrient is needed, but it can kill a tree by burning or overstimulating it if applied incorrectly. Only fertilize when a tree demonstrates a clear need for a specific nutrient. Organic alternatives are always preferable to artificial soil amendments.

	Nitrogen	Phosphorus	Potassium	Iron	Manganese	Zinc
Signs of Deficiency	Uniform yellowing throughout older leaves. New growth is delayed and reduced	Foliage is dark green and may have blue or purple spots	Reduced new growth. Older foliage yellows with brown spots appearing near veins	New growth is pale. Older leaves yellow inward from margins until only veins are green	Like iron deficiency but with symptoms only seen in new growth	Undersized foliage with symptoms of low iron. Foliage turns purple and dies
						
Commonality of Deficiency	Common in all California soils	Rarely affects trees	Common in orchard trees grown in sandy soils	Commonly caused by high pH, not deficiency	Commonly caused by high pH, not deficiency	Common in orchard trees grown in sandy soils
Corrective Application	Nitrate: Fixes immediately Ammonium sulfate: Fixes over time	Fertilizer with high ratio of Phosphorus (ie. 2-8-4)	Fertilizer with high ratio of Potassium (ie. 3-1-3)	Ferrous sulfate: Lowers pH	Manganese Chelate Fertilizer	Fertilizers containing Zinc Sulfate
Organic Alternatives	Manure, blood, fish meal, sewage sludge, grass clippings	Chicken manure, bananas, nuts, grains, bat guano	Composted fruit and vegetable waste	Improved drainage, pine needles, organic compost	Animal manure	Animal manure

Common Pests & Diseases

Symptoms & Treatment



Anthracnos

Trees Commonly Affected:
Affects nearly all plant species but is more prevalent in Sycamores, Elms and Ashes in Northern California.

Symptoms:
Irregular areas of dead tissue on leaves and twigs. Foliage may develop cankers, become distorted and die prematurely.

Treatment:
Prune infected foliage in the fall or winter. Fungicides may prove effective on Ashes, but have not successfully treated other species.



Fire Blight

Trees Commonly Affected:
Apple, Pear, and Loquat.

Symptoms:
Wilting characterized by a severe darkening of shoots and fruits that give the foliage a burned appearance.

Treatment:
Prune any infected tissue back at least 6" into healthy, non-infected foliage. Copper-based insecticides may reduce the severity of an infection.



Fusarium Wilt

Trees Commonly Affected:
Plants with a herbaceous canopy.

Symptoms:
Development of cankers, twig dieback and tissue rot. If suspected, slice open infected branch and look for dark streaks in the tissue. Older limbs will exhibit symptoms first.

Treatment:
Avoid fertilizing, particularly with nitrogen. If the tree is replaced, plant a different species as there are many types of Fusarium Wilt, nearly all of which only infect a single genus.



Powdery Mildew

Verticillium Wilt

Aphids

Trees Commonly Affected:

Trees in areas with moderate temperatures, humidity, or poor air circulation. Rarely observed in areas with direct sunlight.

Symptoms:

White patches develop on foliage. Patches may be damp to the touch or appear as dry spores. Will usually cause affected tissue to become deformed and die prematurely.

Treatment:

Increase air circulation through the canopy if possible. Prune diseased tissues and dispose of them off site. Avoid fertilization and over irrigating the tree.

Trees Commonly Affected:

Nearly all deciduous trees are vulnerable, but particularly Maple, Olive and Pistachio Trees.

Symptoms:

Affected foliage fades before turning yellow or brown and may exhibit wilting. Dark streaks in the vascular tissue similar to that of Fusarium Wilt is also common.

Treatment:

Prune any dead plant material and avoid over fertilization or irrigation.

Trees Commonly Affected:

Nearly all landscape trees. In Fremont Liriodendron trees are particularly vulnerable.

Symptoms:

Presence of aphid insects is the primary indicator as are formations of galls and waxy materials around certain groups of aphid populations.

Treatment:

Use predator species to combat aphids. Beneficial predators include lady beetles and green lacewings. Washing plants with insecticidal soaps has also been successful.

Information on pages 30 - 32 is adapted from Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide by Steve H. Dreistadt

Pruning

Young Trees

Young Trees are often pruned to build structural integrity and direct growth.

The most important aspect of structure in a tree is a strong central leader. The central leader is the branch from which the canopy will spread. Most trees establish a central leader without help. If they do not, they must be pruned to establish a central leader as soon as possible. When selecting a central leader, look for several characteristics. Look for a vertical offshoot that is located close to the center of the trunk. It is rare that a central leader growing exactly in the middle of the trunk will be found. As long as there is an offshoot close to meeting these qualifications it is fine. Trees will correct their growth patterns over time if given assistance. Size is also important as the central leader should be the largest branch on the tree. If choosing between two branches to become the central leader, know that it is easier for the tree to lose a smaller branch than a larger one.

Other important structural-based pruning cuts to be made while the tree is young include the elimination of narrow crotch angles and codominate stems. By removing these structural hazards the tree is protected from future limb breakage.



This tree's central leader directs growth up and out from the trunk



The crotch angles on this tree are far too narrow. The branches on the left and right of the central leader should have been pruned when the tree was younger

Aside from structural based pruning cuts, directing growth is another important element to giving a young tree a healthy foundation. A young tree should be directed to grow up and outward from its trunk. Limbs growing down towards the ground should be eliminated as should limbs that twist back towards the center of the tree. Limbs growing in front of or against one another should be removed as well. By removing these branches a young tree will start to develop a structurally sound and healthy canopy.

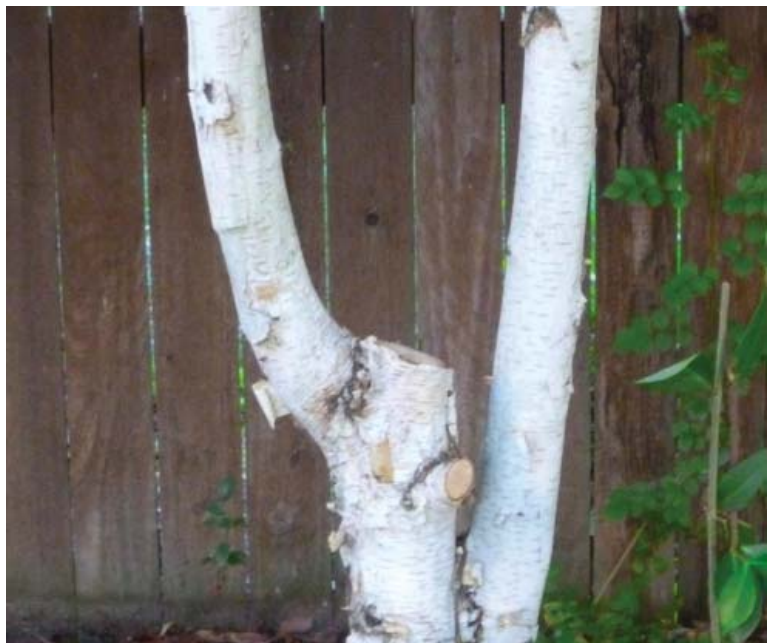
Below: The tree below has a healthy crotch angle that is not at risk of break. This type of crotch angle also helps direct growth up and out from the trunk



Right: This tree illustrates codominance, where multiple leaders direct growth rather than a central leader. This growth is not structurally sound and is discouraged



Above: A young, well pruned Jacaranda mimosifolia thrives across the street from Shinn Park and Arboretum in Fremont



Pruning

Mature Trees

Pruning **mature trees** well eliminates many health problems. Pruning older trees should focus around maintaining structure, energy conservation and disease prevention and treatment.

Similar to young trees, maintaining the central leader is crucial to the structural integrity of mature trees. Branches threatening a central leader's dominance should be pruned before becoming too large. Canopy growth should be directed up and out from the trunk. Branches growing towards the ground need to be eliminated as do branches that cross. Crossing branches cause the tree to become unbalanced and severely damage the tree when a branch fails. Directing growth away from infrastructure is important to prevent damaging the tree. Eliminating narrow crotch angles and codominate stems also remains important later in a tree's life.

It is common to raise a tree's canopy. This affects the structure of a tree, but can be done in ways that either help or harm the tree's health



Watersprouts



Watersuckers



Street tree canopies are often raised to allow for easier pedestrian and vehicular movement through a space

depending on the arborist's skill. As long as dominate branches are preserved, raising the canopy protects a tree while allowing for more function beneath it. It must be remembered however, that at least half of a tree's branches should come from the lower two-thirds of the tree whether the canopy is raised or not.¹

Pruning for pest and disease control is important. For many diseases removing infected tissue is the best treatment. When doing this, cut back into the healthy tissue up to six inches from infected foliage. Beyond disposing of diseased tissue, pruning damaged and dead branches will help prevent infection. When pruning to prevent infection, eliminate any flat or cupped areas at crotch angles where debris or water could fall and become trapped. These areas breed fungal pathogens as they capture moisture and dead plant material that the fungi live off of. This also helps the tree conserve energy as it no longer sends nutrients to these areas.

Pruning for energy conservation is healthy as it helps the tree focus on growing in ways that are conducive to good health and structural integrity. Conserving energy is important as a tree only has so much energy to take care of all its life processes in a growing season. How much energy a tree has is dictated by the amount of sunlight it receives as



When raising the canopy it is important to remember the **2/3rds Rule**: At least half a tree's foliage should be on branches that originate on the lower 2/3rds of the tree



Trees in Blacow Park are pruned to minimize conflict with existing utilities



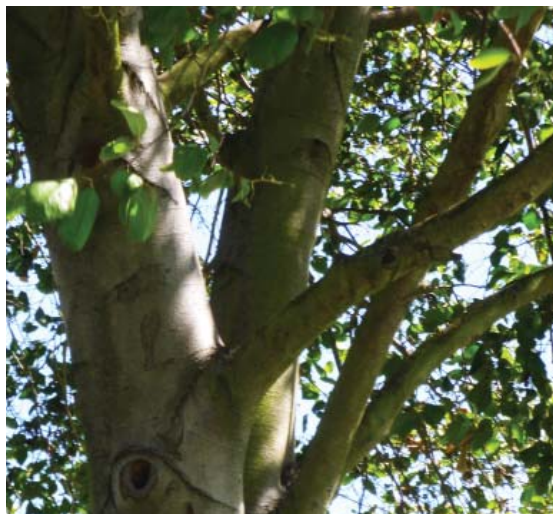
Topping is illegal and never appropriate

¹ Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), 363

Pruning Mature Trees



The trees above and at right need pruning as their branches cross and threaten the structure of the tree



It is important to direct canopy growth away from infrastructure such as buildings or other obstructions



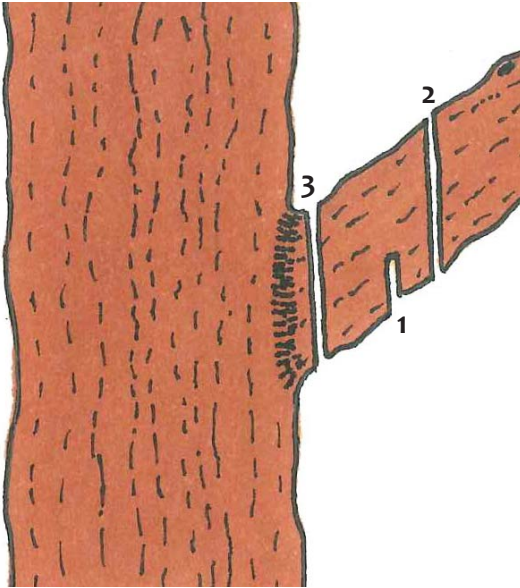
Crotch angles with bowl shaped or flat areas should be avoided as they provide a haven for fungal diseases

well as how many minerals and nutrients are readily available to the roots. Trees waste energy in watersprouts, watersuckers and excess canopy growth.

Watersprouts are shoots of new growth that grow straight up at an almost 90 degree angle from the branch they are coming off of. This type of growth is common after a tree has endured stress such as a severe pruning, hard winter or an infection. Watersprouts are bad for the structure of the tree and should be pruned off at their bases. Similarly, watersuckers are new offshoots originating at the base of the tree that often resemble watersprouts in form. This growth gives no benefits to the tree and should be removed. The tree can then concentrate growth in areas that preserve the dominance of the central leader while continuing to shape the tree upwards and out from the base.

Often the canopies of older trees can become chaotic and dense with excess branches filling the space below the canopy. Cleaning out some of this growth is encouraged as it will ensure that the tree's energy will flow to places where growth is beneficial. Also it allows fruit producing trees to devote more energy towards fruit production when limbs that waste energy are removed.

3-Cut Method



When pruning with a saw, use the 3-Cut Method. As the name implies, three distinct cuts are made:

- 1) Cut the underside of the branch 12" outside of the desired final cut. Cut into the branch about 1/4 of the way.
- 2) A few inches outside of cut one, cut into the top side of the branch until breakage occurs
- 3) Just outside of the branch bark ridge (the rough textured bark where the branch meets with the trunk or another branch) make the final cut going all the way through the branch.

The 3-Cut Method prevents accidental breakage and minimizes pruning wounds

Positive Pruning Practices

- Pruning only what is necessary. If the reason for a cut cannot be determined, it should not have been made
- Using the 3-Cut Method if breakage is possible
- Sterilizing pruning equipment after every use

Negative Pruning Practices

- Pruning more than 25% of a tree in one season
- Pruning based on an schedule rather than need
- Pruning when angry, distracted or inebriated
- Topping or heading a tree

The Process of Pruning

The process of pruning starts well before the first tool is picked up. A pruning operation starts by observing the tree to determine what needs the pruning will address. After listing the needs, come up with a plan. Determine what parts of the tree will require work and in what order the various needs will be addressed during the pruning process.

When pruning, step back and make sure the desired form is developing as intended. It is helpful to mark areas intended to be cut with push pins or stickers before pruning. It is easy to see what needs work from a distance, but it is often confusing to figure out where branches observed from a distance are when working adjacent to the tree. This regular evaluation from multiple viewpoints will ensure that the operation is successful and beneficial to the tree.

Professional Care & Maintenance

What is an Arborist?

Arborist: An individual trained in the art and science of planting, caring for, and maintaining individual trees

ISA: International Society of Arboriculture, the professional organization of arborists worldwide.

A certified arborist has passed an exam covering every aspect of caring for individual trees and earned a professional license. Only a licensed individual is allowed to represent themselves as a certified arborist.

Professions Commonly Mistaken for Arborists

Forester: A professional tree worker who focuses on large groups of trees. This person helps maintain forests, but does not inspect individual trees in urban areas.

Gardener: An individual who maintains an outdoor area professionally or recreationally. There are no requirements for referring to oneself as a gardener in contracts or while billing for work. This person is unlikely to have specialized knowledge of proper tree care.

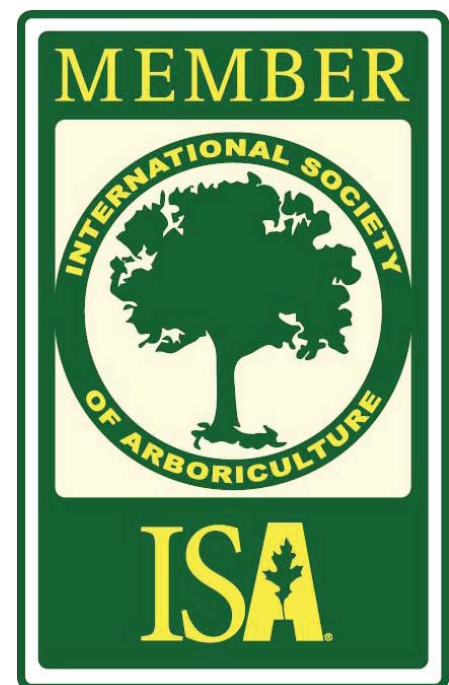
Groundskeeper: This individual has a broad, but often general, knowledge base of the processes involved in maintaining an outdoor area throughout the year. This person directs individual gardeners but may not have the knowledge base to perform advanced tree care.

Tree Worker: Anyone performing work on trees without ISA Arborist Certification.

Selecting an Arborist

Tree work performed in the City of Fremont should be carried out by an arborist certified by the International Society of Arboriculture (ISA). ISA is the professional organization for all arborists that awards licenses to qualified individuals who have passed a comprehensive exam and completed thorough field experience that demonstrates their superior knowledge base and ability in the tree care industry.

Finding an arborist is made easy by the ISA. ISA offers a list of arborists based on local area at <http://www.isa-arbor.com/faca/findArborist.aspx>. Through this link, individuals interested in having tree work performed can find the contact information of local arborists.



Tree Preservation

Preservation During Development

How to Preserve Trees During Development

1 Perform a tree stand delineation:

Inventory the trees found on the site in a list. List the tree species, DBH and overall condition. Are the trees healthy? Are they structurally sound, growing as expected and free of nutrient deficiencies and pathogens? Note whether they are to be preserved or not.

2 Survey trees in relation to development:

Create a map of all trees on site and any planned development. Include trunk locations using appropriately scaled circles and realistic representative canopies. Understand where the trees are on the property and how healthy each one is.

3 Identify trees suitable for preservation:

Identify where healthy, structurally sound trees are located. Figure out which trees are thriving and most likely to survive development. Delineate protection zones around these trees to avoid injuries such as root compaction or damage from construction equipment.

4 Assess potential impacts to trees:

Figure out what aspects of development and construction may impact the trees on site. For example, is there going to be heavy equipment, reduced air quality or changes to the soil type.

5 Suggest modifications to development plans:

Find development activities that cause trees stress and look for alternatives. For example, can grade changes around preserved trees be minimized.

6 Perform pre-construction maintenance:

Do the trees need maintenance? If so, perform as soon as possible so they can recover before construction starts.

7 Monitor the site during construction:

Ensure that construction specifications protecting the trees are followed. If any tree damage occurs the contractor must correct it immediately by implementing mitigation measures.

8 Prepare a post-construction plan:

Prepare maintenance specifications for trees. Anticipate treating shock from construction in the post-construction maintenance plan.



This tree was preserved during the construction of the surrounding business complex

Tree Preservation

Preservation when No New Development is Planned



In a tree stand delineation all trees on a property should be surveyed to see if they suitable for preservation

1 Perform a tree stand delineation:

Inventory trees found on the site. Note all tree species, age and overall condition. Are the trees healthy? Are they structurally sound, growing well and free of nutrient deficiencies and pathogens?

2 Identify trees suitable for preservation:

Identify where trees are located on the property in a map. Figure out which trees are healthy and which may need maintenance or removal.



Preserved *Jubaea chilensis* in Shinn Park and Arboretum in Fremont

3 Assess potential problems:

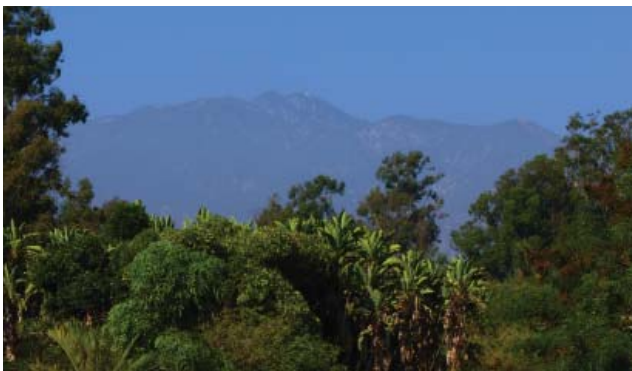
Examine problematic conditions on site. Are any trees suffering from a nutrient deficiency or disease? What could become an issue in the future?

4 Perform needed maintenance:

Perform necessary short-term maintenance such as pruning or treating a nutrient deficiency.

5 Create a long-term maintenance plan:

Determine long term maintenance needs of the preserved trees. Does the irrigation need adjustment or should a natural predator be introduced to fix an aphid problem?



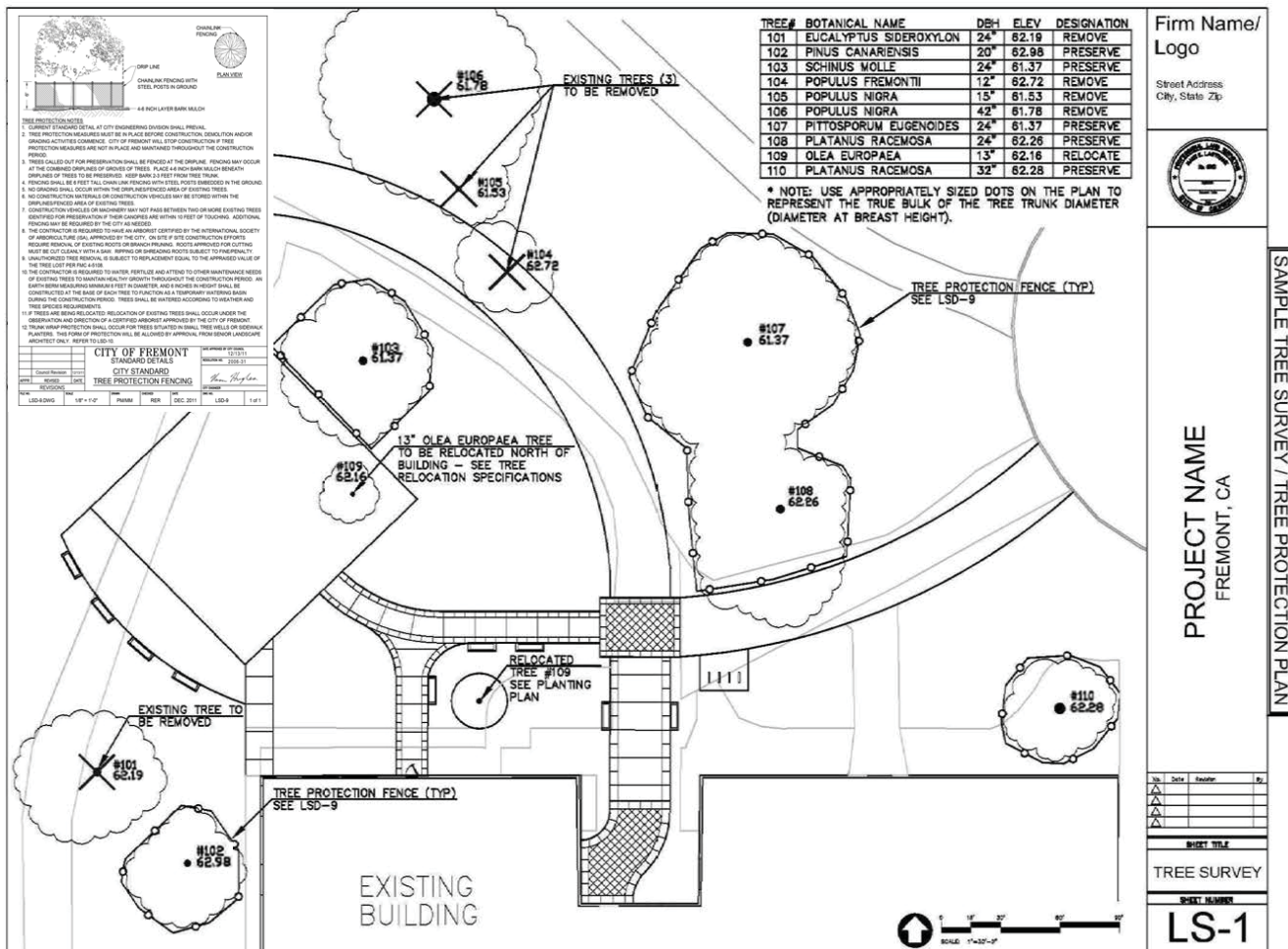
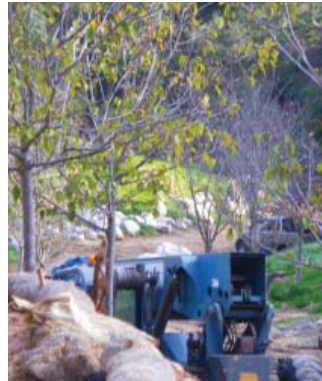
Preserved trees frame the nearby mountains

6 Evaluate and adjust over time:

Evaluate seasonally and observe how the trees are doing. Are there any new problems? Are old issues improving? Adjust long-term maintenance plans when the original is no longer appropriate.

Using an Arborist in Preservation

An arborist is a great resource in any tree preservation plan. This person sees problems that a property owner or construction worker may overlook. They can also assess the longevity of a tree and help a property owner decide which trees will be preserved and how. When it comes to preservation, the knowledge base of an International Society of Arboriculture (ISA) certified arborist is essential.



A Tree Stand Delineation for use in a Development Project

Frequently Asked Questions

Who maintains street trees?

Maintaining a street tree is the responsibility of the adjacent property owner (FMC 6-2201).

How does the City of Fremont prioritize emergency tree work?

If resources are available, the city will prioritize performing tree work in the following order:

- 1) Safety hazards such as split trees, hanging limbs, uprooting or limbs that block a city right-of-way such as a sidewalk or path of vehicular traffic
- 2) Dead, severely diseased or decayed trees
- 3) Trees blocking transit infrastructure such as traffic signals, signage and street lights
- 4) Street trees making physical contact with property in a way that could cause damage
- 5) Limbs that fail to provide an 8' of clearance over sidewalks and 10 – 14' of clearance over streets

What is an encroachment permit?

An encroachment permit allows property owners to perform work that affects adjacent sidewalks or roadways. A permit is needed for activities such as repairing sidewalks, installing an off property dumpster, or working on a sewer line underneath a roadway. To obtain an encroachment permit, please visit <http://www.fremont.gov/FAQ.asp?QID=278>.

Can I plant a street tree?

The City of Fremont grants permits to plant trees in the public right-of-way. Homeowners who request to plant a tree will have their property inspected to determine if there is a suitable location for a tree to be planted. When a location is determined, the city will approve a specific species to plant.

How do I obtain a permit for tree pruning or removal?

Please refer to Page 3 of this document to learn how to obtain a permit.

Can I get a permit for a tree removal if it causes unwanted mess such as dropped leaves or fruit?

The Tree Preservation Ordinance does not consider dropped leaves or fruit a valid reason for tree removal

What if I am concerned or would like to file a complaint about a neighbor's tree?

Conflicts between property owners are usually civil matters and not governed by the Tree Preservation Ordinance. Assuming the tree is not regulated by ordinance, a property owner may choose to refer to Neighbor Law: Fences, Trees, Boundaries & Noise by Cora Jordan. This self-help resource explains state laws involving neighborly conflicts. It advises property owners of what legal action they may pursue independently of the City of Fremont.

What should be done if there is a tree emergency?

In a tree emergency, the City of Fremont's priority is keeping city right-of-ways free and safe from debris. The city will remove fallen limbs from street trees and sizable limbs from privately owned trees that have created an unsafe situation on a sidewalk or street. Debris from private trees removed from city right-of-ways will be placed on the property from which it came. If debris from a street tree is removed outside of business hours the city may place it on adjacent properties and collect the material at the start of the next business day. Below is information on who to contact during a tree emergency:

8 AM – 5 PM on Normal Business Day:
Park Maintenance (510) 979 – 5700

Outside of Normal Business Hours:
Street Maintenance (510) 791 – 4292

What criteria is used in determining whether a street tree should be removed?

Removal of street trees in Fremont is governed by two separate policies. If it is not a landmark tree, the Urban Forestry Manager may issue a Permit to Remove. This permit is typically granted only when a tree is dead, damaged or diseased beyond the hope of recovery. For questions regarding a street tree contact the Urban Forestry Division at (510) 979-5700. If the tree is a landmark tree it must first be delandmarked by City Council before starting the tree removal permit process with the Landscape Architecture Division. Contact the Landscape Architecture Division at (510) 494-4700 for details.

How Much Water Should I Give My Tree?

A tree's water needs depend on the species, annual rainfall in the area, access to underground water sources and the soil in which it is planted.

For the first few years of a tree's life it should be watered twice weekly during the growing season. During each watering session apply roughly 7 1/2 to 10 gallons of supplemental water. This amount should be adjusted accordingly during times of excessive heat or rainfall.



Glossary

Arborist - An individual trained in the art and science of planting, caring for, and maintaining individual trees who has passed the ISA Certification Exam¹ (Page 39)

Caliper – The diameter of a trunk or central leader that extends vertically from the ground plane. This variation should run from thick at the base to thinning further up the trunk (Page 23)

Central Leader – The main stem or bole of the tree¹ (Page 23)

City Right-of-Way – Any avenue of public transportation such as a vehicular road or sidewalk as well as the 11' easement adjacent to city streets that extends from the face of curb perpendicular to the street into adjacent private property within Fremont (Page 1)

Codominant Leaders – Leaders equal in size and relative importance¹ (Page 33)

Crotch – The angle at which two branches meet¹ (Page 33)

DBH – Diameter of a tree's trunk at breast height or 4'-6" above the ground plane (Page 3)

Dripline – The width of the leaf crown, as measured by the outward extent of the foliage¹ (Page 13)

Forester – A professional tree worker who focuses on large groups of trees and helps maintain the world's forests. (Page 39)

Gardener – An individual who maintains an outdoor area professionally or recreationally. (Page 39)

Groundskeeper – An individual with a broad, but often general, knowledge base of the processes involved in maintaining an outdoor area throughout the year. This person may direct individual gardeners (Page 39)

ISA – International Society of Arboriculture (ISA), the professional organization of arborists worldwide that governs industry activities and licensure (Page 39)

Landmark Tree – A tree that has been designated Landmark status by resolution of the City Council or any tree designated in the General Plan as a Primary Historic Resource¹ (Page 2)

Mulch – Any material spread on the soil surface protecting the soil and roots from raindrops, soil crusting, freezing and evaporation¹ (Page 28)

Pollarding - When young trees are initially headed, then reheaded on an annual basis without disturbing the callus knob. This is considered topping and is illegal in Fremont.¹

Private Tree – Any tree growing on private land² (Page 1)

Protected Tree – All street trees and most mature private trees that receive special protection in the Fremont Municipal Code (Page 2)

Public Tree – Any tree owned by the City of Fremont or any protected tree that is not a private tree

Street Tree - A tree whose trunk is within the city right-of-way area starting from the face of curb and extending 11' into a property (Page 1)

Topping - Pruning to reduce height by heading large branches. This creates weak growth and should never be practiced. It is also illegal in Fremont.¹ (Page 36)

Watersprouts – Vigorous, upright shoots from adventitious buds above the groundplane¹ (Page 35)

Watersuckers – Vigorous, upright shoots from the root system at the base of the trunk at or below grade¹ (Page 35)

¹ Richard W. Harris, James R. Clark, and Nelda P. Matheny, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), 525 - 534

² City of Fremont, Tree Preservation Ordinance FMC 4-5100, City Ordinance, serial 4-5100 (Fremont, CA, 2002), 416.

Resources

Books

Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines by Richard W. Harris, James R. Clark, and Nelda P. Matheny, 2004

Pests of Landscape Trees and Shrubs: an Integrated Pest Management Guide by Steve H. Dreistadt, 1994

Tree-Pruning Guidelines by John Britton, 1994

Online Websites

www.usanorth.org for information on 8-1-1 Call Before You Dig

Additional Publications

“Acidic Precipitation- Sources, Deposition, and Canopy Interactions” by Wu, and Davidson, 1990

“Benefit-Cost Analysis of Modesto’s Urban Forest” by McPherson, Simpson, Peper, and Xiao, 1999

“Effect of Aluminum On Plant Growth and Metabolism” by Teresa Mossor-Pietraszewska, 2001

“Effects of individual trees on the solar radiation climate of small buildings” by Gordon M. Heisler, 1986

“Fremont Municipal Code” City of Fremont, 2011

“Greenprint Tree Guide: For the Greater Sacramento Area” by the Sacramento Tree Foundation, 2009

“Human Responses to Vegetation and Landscapes” by Roger S. Ulrich, 1986

“Impact of Urban Forestry Development on Domestic Violence” by Marilyn Simpson-Johnson, 2012

“Residential Property Values Improved by Landscaping with Trees” by L.M. Anderson and H.K. Cordell, 1975

“Tree Preservation Ordinance FMC 4-5100” City of Fremont, 2002